

Claims: I claim:

[1] The device that displays color 3 dimensional image(s) in the space in real time using light virtual fields creating device means.

[2] The device of claim [1] wherein said light virtual fields creating device means is composed of group comprising

- (1) Light rays directing device means
- (2) Light rays selecting device means
- (3) Optionally, Light source means
- (4) Optionally, mask means
- (5) Optionally, optical instruments means

[3] The device of claim [2] wherein said light rays directing device means is composed of group comprising

pinhole arrays, micro-lens arrays, micro-mirror arrays, liquid crystal
pinhole arrays, varifocal pinhole lens, varifocal micro-lens array,
varifocal liquid crystal lens, varifocal liquid crystal micro-lens,
varifocal vertical liquid crystal lens, varifocal horizontal liquid
crystal lens, varifocal liquid crystal fresnel lens, micro-reflector,
varifocal micro-piezoelectric reflector, varifocal piezoelectric micro-
lens, adaptive optical lens, adaptive optical micro-lens

lens, micro-lens, index-gradient lens, pinhole lens, varifocal lens,
liquid crystal varifocal lens, varifocal index-gradient lens, varifocal
liquid crystal varifocal lens, prisms, mirrors, curved mirrors, half-
mirrors, color filters, polarizing plate

[8] The device of claim [1] wherein said light virtual fields creating device
means is composed of group comprising

[4] The device of claim [2] wherein said light rays selecting device means is
composed of group comprising

liquid crystal display, liquid crystal panels, liquid crystal panel with
polarizing plate, micro-liquid crystal arrays, organic electro-
luminescent display, inorganic electro-luminescent display, plasma
display, laser arrays, diode laser arrays, electrodes, clear electro-
conductive sheet, liquid crystal display with continuous grain silicon

[5] The device of claim [2] wherein said light source means is composed of
group comprising

light source, uniform light source, non-uniform light source
diode light emitting plate, arc lamp, halogen light, electron beam
emitter, light bulb

[6] The device of claim [2] wherein said mask means is composed of group
comprising

masks, hole masks, liquid crystal masks, liquid crystal with
continuous grain silicon

[7] The device of claim [2] wherein said optical instruments means is
composed of group comprising

lens, micro-lens, index-gradient lens, pinhole lens, varifocal lens,
liquid crystal varifocal lens, varifocal index-gradient lens, varifocal
liquid crystal varifocal lens, prisms, mirrors, curved mirrors, half-
mirrors, color filters, polarizing plate

[8] The device of claim [1] wherein said light virtual fields creating device
means is composed of group comprising

(1) Three dimensional image display units with flat or curved surface
means

(2) Optionally, motion generating device means

[9] The device of claim [8] wherein said Three dimensional image display
units with flat or curved surface means is composed of group comprising

(1) pinhole arrays, micro-lens arrays, micro-mirror arrays, liquid
crystal pinhole arrays, varifocal micro-lens array

liquid crystal display, liquid crystal panels, liquid crystal
panel with polarizing plate, micro-liquid crystal arrays,
organic electro-luminescent display, inorganic electro-
luminascent display, plasma display, laser arrays, diode
laser arrays, liquid crystal with continuous grain silicon

(2) Optionally, Light source means

(3) Optionally, mask means

(4) Optionally, optical instruments means

[10] The device of claim [8] wherein said motion generating means is

composed of the group consisting of group comprising

linear stage, rotational stage, motors, linear motors, gears, bearing,

magnetic oscillator, electro-magnetic motion generator, ultrasound

motor

[11] The device that changes the focal length of lens using varifocal lens means

[12] The device of claim [11] wherein said varifocal lens means is

composed of group comprising

varifocal index-gradient lens means

comprising layers of materials that changes index of refractions

such as varifocal liquid crystal index-gradient lens

comprising layers of liquid crystals that changes

index of refractions by voltages driven by drivers

[13] The device of claim [11] wherein said varifocal lens means is

composed of group comprising

varifocal index-gradient lens means

comprising varifocal acousto-optic index-gradient lens

comprising layers of optic-optic materials crystals that

changes direction of lights

[14] The device of claim [11] wherein said varifocal lens means is

composed of group comprising

varifocal pinhole lens

comprising liquid crystal pinhole or liquid crystal pinhole arrays

whose diameters change by the pattern created by liquid crystal

panels with polarizing plate

[15] The device of claim [11] wherein said varifocal lens means is

composed of group comprising

varifocal micro-lens arrays

comprising electro-optic material micro-lenses

such as liquid crystal micro-lens array

[16] The device of claim [11] wherein said varifocal lens means is composed of

group comprising

varifocal motion micro-lens arrays

comprising group comprising micro-lenses and the motion

generating device such as motors, magnetic motion generator,

reciprocating motion generator, ultrasound motion generator.